

## Claims

1. An electret condenser microphone comprising:

a vibrating diaphragm in which one face is electrically conductive;

5 a fixed electrode which is placed to be opposed to said vibrating diaphragm via an air layer;

a dielectric layer which becomes an electret for storing charges in one of said vibrating diaphragm and said fixed electrode;

10 circuit means for converting an electrostatic capacity between said vibrating diaphragm and said fixed electrode to an electric signal;

external connecting means for leading out the electric signal; and

15 a spacer which forms and holds a predetermined positional relationship between said vibrating diaphragm and said fixed electrode, and which forms a space between said fixed electrode and said circuit means, said microphone being incorporated in a metallic case while

20 exposing only said external connecting means, wherein

an outer face of said case is coated by a nonmetallic material in which a deforming temperature is higher than a charge dissipating temperature of said dielectric layer that becomes said electret.

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2. The electret condenser microphone according to claim

1, wherein

said nonmetallic material which coats said case is one of polyimide, a liquid crystal polymer, polyetherimide (PEI), polyetheretherketone (PEEK), polyethernitrile (PEN),  
5 and polyphenylene sulfide (PPS), or a composite material containing one of the materials.

3. The electret condenser microphone according to claim 1, wherein said dielectric layer contains  
10 polytetrafluoroethylene (PTFE).

4. The electret condenser microphone according to claim 3, wherein a film thickness of the polytetrafluoroethylene (PTFE) is equal to or larger than three times of a particle  
15 diameter of the PTFE.

5. The electret condenser microphone according to claim 3, wherein said microphone has a structure in which said dielectric layer is a silicon oxide film ( $\text{SiO}_2$ ), and said  
20 silicon oxide film ( $\text{SiO}_2$ ) is thoroughly coated by an insulator other than a silicon oxide film to prevent said silicon oxide film ( $\text{SiO}_2$ ) from being exposed to an atmosphere.

25 6. The electret condenser microphone according to claim 5, wherein

said silicon oxide film ( $\text{SiO}_2$ ) is formed by a plasma CVD (Chemical Vapor Deposition) method or a low-pressure CVD method.

5 7. The electret condenser microphone according to claim 1, wherein

a material of said spacer is one of polyimide, a liquid crystal polymer, polyetherimide (PEI), polyetheretherketone (PEEK), polyethernitrile (PEN), and  
10 polyphenylene sulfide (PPS), or a composite material containing one of the materials.